

REMARKS

In response to the rejection under 35 U.S.C. § 112, it is noted that "a column diameter of 1.2 m or more" is described in original Claims 6 and 13, and at page 12, line 13. This rejection is therefore traversed.

Briefly, the claimed invention is provided to reduce the plugging of portions of a distillation apparatus by polymerization of a polymerizable condensate from the distillation column. According to the invention, this is provided by controlling the pressure of the distillation column via regulation of the exhaust gas of a vacuum generator connected to the vapor phase connecting port of the reflux tank of the distillation apparatus.

In the invention, using the distillation apparatus thus constructed, the action of the pressure control valve (8) is controlled based on the pressure of the distillation column (1) to adjust the amount of the exhaust gas to be introduced, thereby controlling the pressure of the distillation column (1) within a fixed range. Accordingly, in the pressure control valve (8), the residence of the condensate of the readily polymerizable compound is prevented by the flow of the exhaust gas from the ejector (4), whereby plugging due to the polymerization is prevented. Also, since the readily polymerizable compound-containing exhaust gas from the ejector (4) is utilized, a loss of the readily polymerizable compound is prevented. Further, the polymerizable compound in the exhaust gas from the ejector (4) is recovered in the liquid seal tank (6). Incidentally, the pressure of the distillation column (1) to be controlled is properly chosen as distillation conditions of the crude readily polymerizable compound. (Specification, paragraph bridging pages 27-28).

No combination of the cited prior art teaches or suggests a distillation apparatus including a pressure control valve connected to the exhaust gas conduit of a vacuum generator connected to the vapor phase connecting port of a reflux tank of the apparatus, as is recited in Claim 1. Indeed, no combination of the cited prior art teaches or suggests controlling the flow of the exhaust gas of a vacuum generator to reduce the plugging of portions of a distillation apparatus by polymerization of a polymerizable condensate from the distillation apparatus.

Claims 1, 2, 4, 21, 22 and 24 were rejected under 35 U.S.C. § 103 as being obvious over Matsumoto et al in view of Hamamoto et al, now further in view of newly cited U.S. patent 5,702,504 (Schaub et al) which was cited to teach pressure controls at col. 7, lines 10-27 thereof. However it is respectfully submitted that this prior art is no more material to the claims than was that cited in the last Office Action.

As was previously explained, Matsumoto et al is devoid of a description of the novel features of the claimed invention. Matsumoto et al teaches that the clogging of a purifying system by a polymerizable material is inhibited by adding a polymerization inhibitor to liquid contact chambers of the system (col. 3, lines 28-34 and lines 54-57). Matsumoto et al lacks a reflux tank, a pressure control valve connected to the exhaust gas conduit of the vacuum generators E1 or E2, or a pressure controller connected to the pressure control valve, the pressure controller having a pressure detection line. The valve 8 of Matsumoto et al is merely used to control the delivery of outside air into the line connecting the condenser 2 with the vacuum generator E1. There is no teaching of a pressure control valve connected to an exhaust gas conduit of the vacuum generator E1.

Thus the similarities between Matsumoto et al and the claimed invention are limited to the presence of a distillation column, a condenser, a vacuum generator and a controlled valve (which does not control the exhaust gas of the vacuum generator). A reflux tank, the condenser being connected to a reflux tank, the vacuum generator being connected to a reflux tank, and a pressure control valve connected to the exhaust gas conduit of the vacuum generator are all missing from Matsumoto et al.

Hamamoto et al was cited to suggest the use of a reflux tank in conjunction with a distillation column but provides no teaching for the claimed manner of integration of the reflux tank with a condenser and a vacuum generator. In any case, Hamamoto et al also fails to teach the claimed pressure control valve and pressure controller.

Schaub et al discloses a vacuum pressure swing absorption process having two adsorbent beds A and B. Valves 10A and 12A may be controlled to permit product gas from one adsorbent bed to be used to purge the other bed. Schaub et al is otherwise unrelated to the claimed invention.

It may therefore be appreciated that the claims define over any obvious combination of the above references. A reflux tank, a condenser connected to a reflux tank, the connection of a vacuum generator to a reflux tank, and a pressure control valve connected to the exhaust gas conduit of the vacuum generator are all missing from Matsumoto et al. Hamamoto et al may suggest the use of a reflux tank in conjunction with a distillation column but provides no teaching for the claimed manner of integration of the reflux tank with a condenser and vacuum generator, or the missing pressure control valve. Schaub et al discloses the existence of flow control valves for purging an adsorbent bed, but provides no motivation for one skilled in the art to have provided Matsumoto et al with a pressure control valve connected to an exhaust gas conduit of the vacuum generator. Without a teaching that a control valve should be connected to the exhaust gas conduit of a vacuum generator, the mere disclosure of control valves in an unrelated environment, as in Schaub et al, cannot overcome the shortcomings of Matsumoto et al.

Claims 3, 23, 29 and 30 further recite a perforated tray disposed in the distillation column. Mizutani et al was cited in combination with Matsumoto et al, Hamamoto et al and Schaub et al to reject these claims under 35 U.S.C. § 103, wherein Mizutani et al was cited to suggest the use of a perforated tray in Matsumoto et al. However, regardless of what teaching Mizutani et al may have in this respect, it provides no teaching for modifying Matsumoto et al to provide the reflux tank, vacuum generator, pressure control valve and pressure controller recited in Claim 1, and so the claims define over any combination of the above references.

Dependent Claims 25-28 were also rejected under 35 U.S.C. § 103 as being obvious over Matsumoto et al in view of Hamamoto et al, Schaub et al and Mizutani et al. However here again, the teachings of Mizutani et al with respect to the dependent claims would not overcome the shortcomings of the prior art with relative to Claim 1.

It is respectfully requested that the Examiner contact the undersigned attorneys to arrange an interview if the present response is insufficient to overcome the outstanding rejections.

Applicants therefore believe that the present application is in a condition for allowance and respectfully solicit an early notice of allowability.

Customer Number

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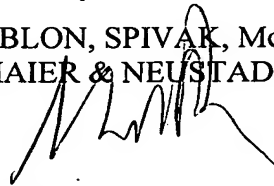
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